



1967

Eightieth Annual Report of the Tennessee Agricultural Experiment Station, 1967

University of Tennessee Agricultural Experiment Station

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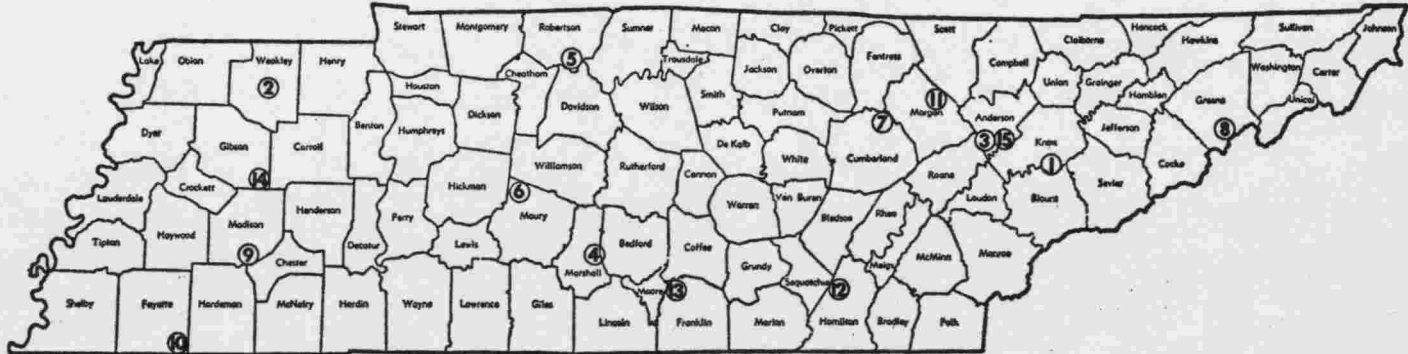
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UNIV. OF TENN.

Eightieth
Annual Report
of the
Tennessee Agricultural
Experiment Station
1967

The University of Tennessee
Knoxville

THE UNIVERSITY OF TENNESSEE AGRICULTURAL EXPERIMENT STATION



- 1 Main Station
- 2 University of Tennessee at Martin

- 3 U-T/AEC Agricultural Research Laboratory

Branch Stations

- 4 Dairy Experiment Station
- 5 Highland Rim Experiment Station
- 6 Middle Tennessee Experiment Station
- 7 Plateau Experiment Station
- 8 Tobacco Experiment Station
- 9 West Tennessee Experiment Station

Field Stations

- 10 Ames Plantation
- 11 Cumberland Forestry Field Station
- 12 Friendship Forestry Field Station
- 13 Highland Rim Forestry Field Station
- 14 Milan Field Station
- 15 Oak Ridge Forest and Arboretum

Eightieth Annual Report 1967

Tennessee Agricultural Experiment Station

Andrew D. Holt	President of the University
Webster Pendergrass	Dean of Agriculture
E. J. Chapman	Assistant Dean
John A. Ewing	Director
Eric Winters	Associate Director

**The University of Tennessee
Knoxville**

LETTER OF TRANSMITTAL

Knoxville, Tennessee
January 2, 1968

To His Excellency, Buford Ellington
Governor of Tennessee

SIR: I have the honor of transmitting herewith, on behalf of the Board of Trustees of the University of Tennessee, a report of the work and expenditures of the Agricultural Experiment Station for the year 1967.

This report is submitted in accordance with the law requiring that such a report be submitted annually by the administrators of the Experiment Station to the Governor of the State.

Respectfully submitted,
Andrew D. Holt, President

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The Eightieth Annual Report of the Tennessee Agricultural Experiment Station 1967

Foreword

Included in this report are listings by departments of the following information:

- 1) Research projects active as of December 31, 1967;
- 2) Research projects terminated during the calendar year 1967;
- 3) Bulletins, articles, and reports prepared by Experiment Station staff members and published during the calendar year 1966.

In addition, this report contains the financial statement for the Agricultural Experiment Station covering the period July 1, 1966, to June 30, 1967. Also included is a list of the Experiment Station personnel for the calendar year.

Active Projects

As of December 31, 1967, there were 134 active Hatch projects and 32 active State projects. Hatch projects are supported in part with Federal-Grant funds made available by Congress to the Agricultural Experiment Stations of the country under the Hatch Act Amended. State projects are supported entirely by University funds.

In addition, there were 9 McIntire-Stennis and 18 University of Tennessee-Atomic Energy Commission projects.

The headquarters of the Tennessee Agricultural Experiment Station is located on the agricultural campus of the University of Tennessee at Knoxville. The U-T/AEC Agricultural Research Laboratory is located some 20 miles distant at Oak Ridge, Tennessee. In addition, there are other research centers which represent soil and climatic conditions in the major regions of Tennessee.

FINANCIAL STATEMENT

July 1, 1966 - June 30, 1967

The University of Tennessee Agricultural Experiment Station

Activity	Federal			
	Hatch Act Amended			
	Regular	Regional Research	Co-Op. Forestry Res. Act	Non- Federal
Receipts	\$1,211,465.00	\$216,703.00	\$75,830.37	\$2,362,546.87
Expenditures				
Personal Services	\$1,114,453.04	\$204,763.57	\$58,128.54	\$ 946,815.87
Travel	3,115.26	1,726.83	2,231.85	61,355.22
Equipment	38,092.51	7,738.50	10,090.62	137,390.50
Lands and Structures	7,858.75			166,369.31
Personnel Benefits				214,530.37
Supplies and Materials	15,969.02	2,218.37	1,001.83	523,470.00
All Other	31,976.42	255.73	1,784.58	312,615.60
Unobligated			2,592.95	
Total	\$1,211,465.00	\$216,703.00	\$75,830.37	\$2,362,546.87

These other research centers are listed at the end of this report, and the locations are shown on the inside front cover.

Many of the projects involving studies of soils, crops, and livestock may include experimental work at one or more of the outlying stations as well as at the Main Station at Knoxville.

Projects Terminated

During 1967, 9 projects were terminated. Reports on these projects have either been published or are being prepared for publication.

Publications

Published reports on research of the Tennessee Agricultural Experiment Station appear in Station Bulletins, in Tennessee Farm and Home Science, as well as in professional and technical periodicals and in various popular publications. There were 17 Station Bulletins published during the year. The number of technical, semi-technical, and popular articles prepared by staff members and published during 1967 was 130. In addition, staff members published 1 regional bulletin, and 4 extension-type publications.

AGRICULTURAL BIOLOGY

Proj. No.	Research Project Titles
Hatch 49	Determination of Residues from Certain Pesticides When Applied for Normal and Experimental Control of Insects and Diseases of Fruit and Forage Crops in Tennessee; cooperative with the Agronomy Department (contributing to Regional Proj. S-22).
Hatch 96	Insects Affecting Alfalfa; cooperative with the Agriculture Department, University of Tennessee at Martin (contributing to Regional Proj. S-55).
Hatch 98	Life History, Ecology, and Control of Major Cotton Insects.
Hatch 132	Breeding Disease-Resistant Tobacco.
Hatch 135	Control of Cotton Verticillium Wilt; cooperative with the Agronomy Department and the U. S. Department of Agriculture Cotton Section.

- Hatch 138 Biology and Control of Plant Parasitic Nematodes; cooperative with the U. S. Department of Agriculture.
- Hatch 139 Associations Among Soil Microorganisms as Related to the Incidence and Severity of Plant Diseases (contributing to Regional Proj. S-26).
- Hatch 140 Evaluating New Fungicides.
- Hatch 174 Breeding Strawberries for Tennessee Markets with Emphasis on Climatic Adaptability and Disease Resistance; cooperative with the Horticulture Department.
- Hatch 203 Control of Insects Attacking Nursery Plants.
- Hatch 208 Breeding for Improvement in Small Grains (wheat, oats, barley, and rye) ; cooperative with the Agronomy Department.
- Hatch 213 Biology, Distribution, and Control of Corn Insects; cooperative with the Agriculture Department, University of Tennessee at Martin.
- Hatch 228 Snap Bean Production Mechanization; cooperative with the Agricultural Economics, Agricultural Engineering, Food Technology, and Horticulture Departments.
- Hatch 239 Factors Influencing Survival and Pathogenicity of Plant Parasitic Nematodes (contributing to Regional Proj. S-19).
- Hatch 241 The Disposition of Pesticides in the Soil (contributing to Regional Proj. S-62).
- Hatch 246 Application of Ultra Low Volumes of Insecticides with Ground Spraying Equipment; cooperative with the Agricultural Engineering Department.
- Hatch 251 Diseases of Small Grains.
- Hatch 253 Investigation of an Unidentified Corn Virus Disease Occurring in Tennessee; cooperative with the Agronomy Department and the U. S. Department of Agriculture.
- Hatch 260 Diseases of Ornamentals and Associated Nursery Crops.

Hatch 263	Snap Bean Diseases.
Hatch 264	Distribution, Biology, and Control of Tobacco Insects.
State 15	Impact of Mechanization on Costs and Returns in Cotton Production; cooperative with the Agricultural Biology, Agricultural Engineering, and Agronomy Departments.
State 21	Evaluation of New Insecticides.
State 47	Farm Pond Biology.

Projects Concluded in 1967

Hatch 167	Breeding Tomatoes for Tennessee Markets with Emphasis on Earliness and Disease Resistance; cooperative with the Horticulture Department.
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Bulletins, Articles, and Reports—1967

Bennett, S. E.

Control of Alfalfa Weevil Larvae with One Application of an Experimental Carbamate Insecticide. Tennessee Farm and Home Science Progress Report 63, 1967.

Bennett, S. E., Houston Luttrell, Henry Andrews, and John Reynolds

Results of Winter Flaming of Alfalfa in Tennessee, 1965-66. Proceedings, Fourth Annual Symposium on Thermal Agriculture, Kansas City, Missouri (January), pp. 30-31.

Bennett, S. E., L. M. Josephson, and E. E. Burgess

Field and Laboratory Studies on Resistance of Corn to the Corn Earworm. Journal of Economic Entomology 59(6):171-173, 1967.

Caldwell, Sloan D.

Cotton, A New Host for the Spider Mite *Eotetranychus smithi*. Journal of Economic Entomology 60(4):1169, 1967.

Chambers, A. Y.

Evaluation of Fungicides for Control of Stem Anthracnose of Lima Beans. Tennessee Farm and Home Science Progress Report 62, 1967.

Chambers, A. Y.

Lima Bean Stem Anthracnose, *Colletotrichum truncatum*. Fungicide-Nematocide Tests Results of 1966 22:57, 1967.

Chambers, A. Y.

Cotton Seedling Diseases, *Rhizoctonia solani*, *Pythium* spp., and *Fusarium* spp. Fungicide-Nematocide Tests Results of 1966 22:92, 1967

Chambers, A. Y.

Stem Anthracnose of Lima Beans. Which Fungicide Will Control It Best? Tennessee Farmer 14(10):16A, 1967.

Chambers, A. Y. and J. M. Epps

Nature of Soybean Resistance to *Heterodera glycines*. Plant Disease Reporter 51:771-774, 1967.

Chambers, A. Y. and C. H. Hadden

Cotton Seedling Disease Control. University of Tennessee Agricultural Extension Plant Disease Information Sheet 420, 1967.

Chambers, A. Y. and C. H. Hadden

Cotton Seedling Disease Control. Tennessee Farmer (West Edition) 14(4): 12-13, 1967.

Epps, J. M. and A.Y. Chambers

Control of the Soybean Cyst Nematode. Soybean Digest 27(9):6-9, 1967.

Epps, J. M. and A. Morgan Golden

Suitability of Kobe Lespedeza for Reproduction of Isolates of the Soybean Cyst Nematode from Nine Locations. Plant Disease Reporter 51(9):775-776, 1967.

Epps, J. M. and Edgar E. Hartwig

Dyer, A New Nematode-Resistant Soybean Variety. Tennessee Agricultural Experiment Station Bulletin 426, 1967.

Heinrichs, E. A.

Distribution of Eggs and Leaf Mines of *Choristoneura houstonana* (Grote) (Lepidoptera: Tortricidae) Attacking Eastern Redcedar, *Juniperus virginiana*. Journal Kansas Entomological Society 40:353-355, 1967.

Hilty, J. W. and C. H. Hadden

Maize Dwarf Mosaic. University of Tennessee Agricultural Extension Information Sheet 430, 1967.

Hilty, J. W. and C. H. Hadden

Stem Rot and Root Rot of Snap Bean. Fungicide-Nematocide Tests Results of 1966 22:57, 1967.

Johnson, L. F.

Rose Blackspot. American Rose Annual 52:63-68, 1967.

Johnson, L. F., Albert Y. Chambers, and Howard E. Reed

Reduction of Root Knot of Tomatoes with Crop Residue Amendments in Field Experiments. Plant Disease Reporter 51:219-222, 1967.

Luttrell, D. H., S. E. Bennett, and V. E. Gordon

Equipment for Thermal Control of the Alfalfa Weevil. Tennessee Farm and Home Science Progress Report 64, 1967.

Pless, C. D. and W. W. Stanley

Life History and Habits of the Dogwood Borer, *Thamnosphesia scitula* (Harris), in Tennessee. Journal of The Tennessee Academy of Science 42(4):117-123, 1967.

Pless, C. D. and D. H. Latham

Hornworms Controlled on Dark Fire-Cured Tobacco with Experimental Systemic Insecticide. Tennessee Farm and Home Science Progress Report 62, 1967.

Reed, H. E.

Evaluation of Fungicides for Control of Peach Scab Caused by *Cladosporium carpophilum* Theum. Fungicide-Nematocide Tests Results of 1966 22:49, 1967.

Reed, H. E. and C. H. Hadden

Dutch Elm Disease. University of Tennessee Agricultural Extension Plant Disease Information Sheet 2, 1967.

Reed, H. E., A. Y. Chambers, and C. O. Qualset

Chemical Seed Treatment for Control of Loose Smut in Winter Barley. Tennessee Farm and Home Science Progress Report 63, 1967.

Russell, W. G.

A Comparative Study of the Embryonic Stages at Diapause of Some Species of Grasshoppers in East Tennessee. Journal of The Tennessee Academy of Science 42(2):57-64, 1967.

Russell, W. G. and W. W. Stanley

Observations of *Odontopus calceatus* (Coleoptera: Curculionidae), A Leaf Miner Damaging Yellow-Poplar. Journal of The Tennessee Academy of Science 42(3):93-96, 1967.

Russell, W. G. and W. W. Stanley

Observations of *Odontopus calceatus* (Say) (Coleoptera: Curculionidae), A Leaf Miner Damaging Yellow Poplar in Tennessee. Tennessee Farm and Home Science Progress Report 62, 1967.

Southards, C. J.

The Pseudo-Root-Knot Nematode of Bermudagrass in Tennessee. Plant Disease Reporter 51:455, 1967.

Southards, C. J. and C. J. Nusbaum

Genetic Variability of Tobacco Response to *Pratylenchus brachyurus*. Phytopathology 57(1):18-21, 1967.

Stanley, W. W. and W. G. Russell

Growth Responses of Flowering Crabapple and Control of Red-banded Leaf Roller Following Applications of Systemic Insecticides. Journal of Economic Entomology 60(3):885, 1967.

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

Proj. No.

Research Project Titles

Hatch 16 Marketing and Utilizing Low-Quality Hardwoods.

Hatch 179 An Economic Appraisal of Farming Adjustment Opportunities in Selected Areas of Tennessee to

- Meet Changing Conditions; cooperative with TVA and the U. S. Department of Agriculture (contributing to Regional Proj. S-42).
- Hatch 205 An Economic Appraisal of Agricultural Credit Used by Tennessee Farmers.
- Hatch 206 Cost-Return Ratios in Farming in Tennessee.
- Hatch 212 Increasing Efficiency in the Tennessee Vegetable Industry (contributing to Regional Proj. SM-30).
- Hatch 223 The Impact of Changing Market Structure upon the Competitive Position of the Dairy Industry in the South (contributing to Regional Proj. SM-28).
- Hatch 225 The Demand for Outdoor Recreation in Tennessee.
- Hatch 226 Income Potentials from Alternative Farm Organizations in Various Types of Farming Areas.
- Hatch 227 Optimum Location of Livestock and Meat Marketing Facilities in the South (contributing to Regional Proj. SM-27).
- Hatch 228 Snap Bean Production Mechanization; cooperative with the Agricultural Biology, Agricultural Engineering, Food Technology, and Horticulture Departments.
- Hatch 229 Factors Affecting the Utilization of Cotton and Competing Fibers (contributing to Regional Proj. SM-31).
- Hatch 231 Optimal Adjustments of Southern Grain Marketing Facilities to Present and Future Conditions (contributing to Regional Proj. SM-29).
- Hatch 236 The Marketing and Utilization of Pesticides in Tennessee.
- Hatch 249 Human Resource Development and Mobility in the Rural South (contributing to Regional Proj. S-61).
- Hatch 252 Demand for Food (contributing to Regional Proj. SM-34).
- Hatch 259 Egg Marketing Systems for the South (contributing to Regional Proj. SM-37).
- Hatch 262 Civil Defense and Food Stocks.

Hatch 270	The Management of Insurable Risk in Tennessee Agriculture.
Hatch 272	Vertical Integration in Tennessee Agriculture.
State 15	Impact of Mechanization on Costs and Returns in Cotton Production; cooperative with the Agricultural Biology, Agricultural Engineering, and Agronomy Departments.
State 34	Sales Value of Cotton Allotments in Tennessee.
State 37 (T-1)	Human and Natural Resource Development in the Appalachian Region (USDA, CSRS Grant 508-15-6-Appal.).
State 38 (T-2)	Reducing the Cost of Producing Cotton through the Management and Application of Technology (USDA, CSRS Grant 616-15-23).
State 43	Impact of Agriculture on the Agri-Business Complex of Metropolitan Trade Areas in Tennessee.
State 44	The Woody Ornamental Nursery Industry in Tennessee; cooperative with the U. S. Department of Agriculture.
State 46	Causes of Lag in Increase in Net Income per Farm in Tennessee.

Projects Concluded in 1967

Proj. No.	Research Project Titles
Hatch 12	Type and Breed as Factors Influencing Beef Carcass Characteristics and Consumer Acceptance; cooperative with the Animal Husbandry-Veterinary Science Department and the U. S. Department of Agriculture.
Hatch 210	Organization and Structure of the Marketing System for Tennessee Broilers (contributing to Regional Proj. SM-26).

Bulletins, Articles, and Reports—1967

Anderson, James M. and Luther H. Keller

Reduction of Beef Cattle Protein Supplement Costs Through Use of Urea.
Tennessee Farm and Home Science Progress Report 63, 1967.

Badenhop, M. B.

An Economic Survey of the Upper Cumberland Area with Special Reference to Agriculture. Tennessee Agricultural Experiment Station Bulletin 428, July 1967.

Boone, Larry M. and Curtis F. Lard

Changes in Tennessee Agriculture by Counties, 1954-1964. Tennessee Agricultural Experimental Station Bulletin 433, December 1967.

Brinkley, Lew E. and C. L. Cleland

Family Mobility in Rural Low-Income Areas of Tennessee. Tennessee Farm and Home Science Progress Report 61, 1967.

Dubov, Irving

Editor - Book - **Contemporary Agricultural Marketing**. Knoxville: University of Tennessee Press, December 1967.

Lard, Curtis F., E. A. Stennis, and T. C. McCutchen

Economics of Alternative Skip-Row Cotton Planting Patterns. Tennessee Farm and Home Science Progress Report 63, 1967.

Leuthold, Frank O. and M. B. Badenhop

The Social-Economic Position of the Elderly in Tennessee and the Plateau Region. Tennessee Farm and Home Science Progress Report 62, 1967.

Leuthold, Frank O., Charles M. Farmer, and M. B. Badenhop

Migration of Young Adults from a Low-Income Rural County. Tennessee Farm and Home Science Progress Report 63, 1967.

Morrow, William R. and Joe A. Martin

Firewood as an Outlet for Low-Quality Hardwoods—A Survey of Consumers and Retailers in Knoxville. Tennessee Agricultural Experiment Station Bulletin 425, July 1967.

Ranney, W. P.

Farm Cost-Return Ratios in Selected Dairy Farm Situations. Tennessee Farm and Home Science Progress Report 63, 1967.

Raskopf, B. D.

Broiler Condemnations—Their Economic Importance. Tennessee Farm and Home Science Progress Report 62, 1967.

Raskopf, B. D.

Cotton Quality Marketing Research in Tennessee—1928 to 1966. Tennessee Farm and Home Science Progress Report 61, 1967.

AGRICULTURAL ENGINEERING

Proj. No.

Research Project Titles

Hatch 32	Chemical Weed Control; cooperative with the Agronomy and Horticulture Departments.
Hatch 96	Insects Affecting Alfalfa; cooperative with the

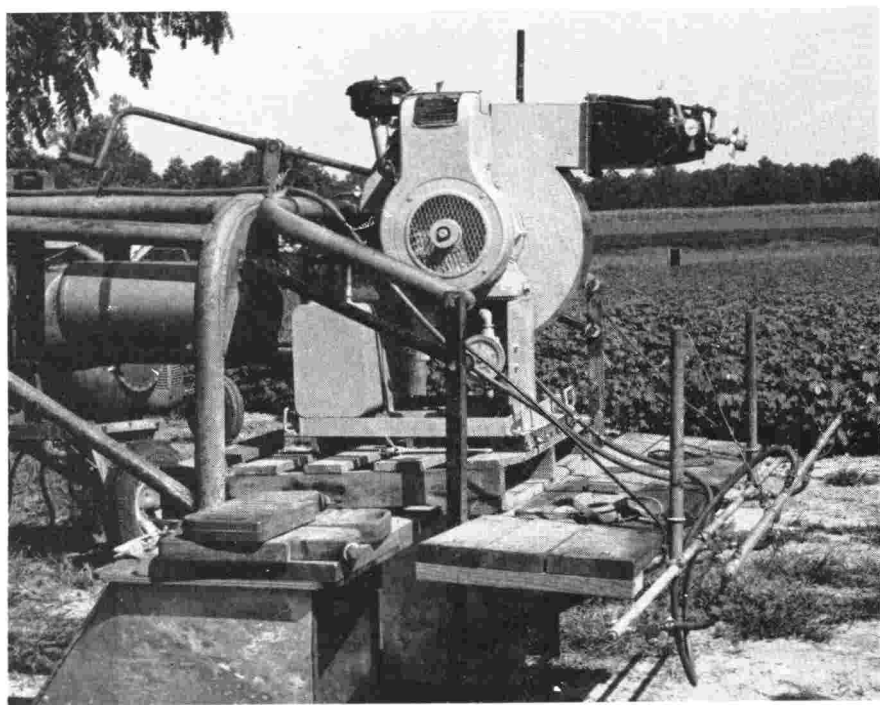


Figure 1. High-clearance mist sprayer with mini-spin and twin fluid nozzles used in experimental low-volume research work.

Agricultural Biology Department (contributing to Regional Proj. S-55).

- Hatch 204 Factors Affecting Water Yields from Small Watersheds in Tennessee; cooperative with the UT/AEC Agricultural Research Laboratory, TVA, Soil Conservation Service, and the University of Tennessee Water Resources Research Center (contributing to Regional Proj. S-53).
- Hatch 209 Development of an Okra Trimmer.
- Hatch 214 Behavioral Responses of Chickens to Environmental Factors; cooperative with the Poultry Department.
- Hatch 219 Pond Sealing; cooperative with the University of Tennessee Water Resources Research Center.



Figure 2. Liquid manure pump (attached to tractor on right) being used to load manure from a concrete pit (under tank and tractor on left) into a tank where the manure will be hauled to a nearby field for spreading. The experiment is being conducted at the Dairy Experiment Station, Lewisburg.

- | | |
|-----------|---|
| Hatch 228 | Snap Bean Production Mechanization; cooperative with the Horticulture, Food Technology, Agricultural Biology, and Agricultural Economics Departments. |
| Hatch 240 | Cotton Production Mechanization. |
| Hatch 246 | Application of Ultra Low Volumes of Insecticides with Ground Spraying Equipment; cooperative with the Agricultural Biology Department. |
| State 7 | Electric Treatment of Plant Materials; cooperative with the Agronomy and Food Technology Departments, and the U. S. Department of Agriculture. |
| State 15 | Impact of Mechanization on Costs and Returns in Cotton Production; cooperative with the Agricultural Biology, Agricultural Economics, and Agronomy Departments. |
| State 22 | Effect of Structural Characteristics of Vertical Silos and Silo Equipment and Maintenance Costs, Silage Quality, and Milk Production; cooperative |

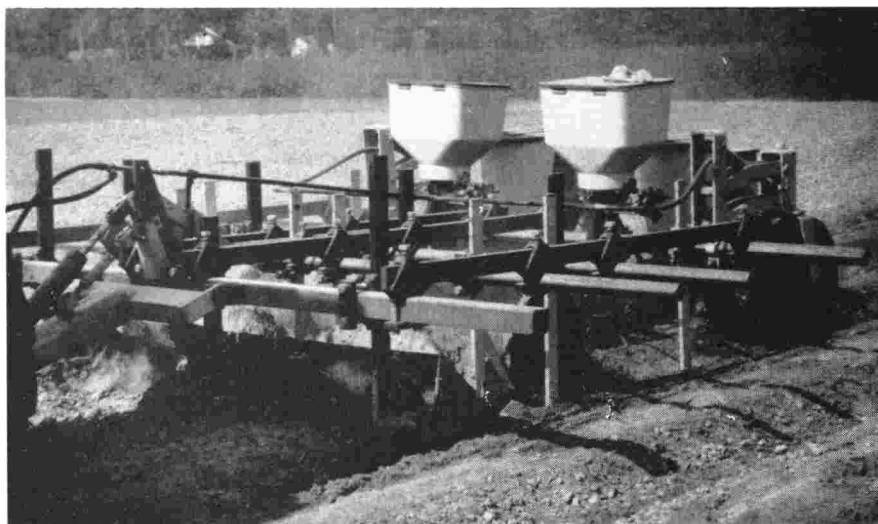


Figure 3. The use of multiple tool bar equipment has been employed toward reducing the number of trips necessary to establish a stand of cotton. Six operations are done with this machine in one trip—bedding, bed shaping, bed compacting, fertilizer application, planting, and chemical application. One hose and a pin type hitch are the only connection to the tractor.

with the Dairying Department and the National Silo Association.

State	25	Land Forming for Drainage and Furrow Irrigation; cooperative with the West Tennessee Experiment Station and the Soil Conservation Service.
State	48	Purification of Pond Water.

Projects Concluded in 1967

Proj. No.	Research Project Titles
Hatch 202	Electrical Properties of Cotton Fiber; cooperative with the Physics Department.

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Bennett, S. E., D. H. Luttrell, Henry Andrews, and John Reynolds
Results of Winter Flaming in Tennessee for 1965-1966. Proceedings of the Fourth Annual Symposium on Thermal Agriculture 4:30-31, 1967.

- Goodenough, John L. and Richard N. Fenzel
An Inexpensive Electrical Analog for Flow in Porous Media. *Journal of Soil and Water Conservation* 22(2):72-75, 1967.
- Henry, Z. A. and Reba Lawson
Instruments for Cotton Fiber Evaluation. *Tennessee Farm and Home Science Progress Report* 64, 1967.
- Henry, Z. A. and S. Worley
A Cotton Opener-Cleaner for Research Samples. *Proceedings of the Belt-wide Cotton Production Research Conference, National Cotton Council of America, Memphis, p. 122-126, 1967.*
- Luttrell, D. H., S. E. Bennett, and V. E. Gordon
Equipment for Thermal Control of Alfalfa Weevil. *Tennessee Farm and Home Science Progress Report* 64, 1967.
- McDow, John J.
New Knowledge for Progress. *Phi Kappa Phi Journal* XLVII (1):43, 1967.
- Mullins, J. A.
Skip-Row and High Beds for Cotton. *Tennessee Farm and Home Science Progress Report* 64, 1967.
- Sewell, John I., Ben P. Hazlewood, and Thomas C. McCutchen
Sedimentation and Erosion in Tennessee Ditches. *Tennessee Farmer* 14(1):4, 1967.
- Sewell, John I.
Sealing Ponds Chemically. *Agricultural Engineering* 48(5):270-271, 1967.

AGRONOMY

Proj. No.	Research Project Titles
Hatch 28	Moisture Sorption Characteristics of the Major Soils of Tennessee and the Relation of Moisture Tensions to Plant Growth and Fertilizer Utilization; cooperative with TVA and the U. S. Department of Agriculture.
Hatch 32	Chemical Weed Control; cooperative with the Departments of Agricultural Engineering and Horticulture.
Hatch 33	Evaluation of the Performance of Varieties of Field Crops; cooperative with the Agriculture Department, University of Tennessee at Martin.
Hatch 34	Corn Improvement; cooperative with the U. S. Department of Agriculture.

- Hatch 38 The Comparative Value and Relative Efficiency of Various Phosphate Fertilizers under Different Soil and Cropping Conditions; cooperative with the Agriculture Department, University of Tennessee at Martin.
- Hatch 42 Potassium Fertilization of Farm Crops on Different Soil Series in Tennessee.
- Hatch 45 Movement and Persistence of Herbicides in the Soil (contributing to Regional Proj. S-18).
- Hatch 47 Establishment and Maintenance of Turf; cooperative with the Agriculture Department, University of Tennessee at Martin.
- Hatch 48 Soil Survey of Tennessee to Help Determine Crop Adaptation and Management Requirements; cooperative with the U. S. Department of Agriculture.
- Hatch 49 Determination of Residues from Certain Pesticides when applied for the Normal and Experimental Control of Insects and Diseases of Fruits and Forage Crops in Tennessee; cooperative with the Agricultural Biology Department.
- Hatch 56 Trace Elements in Tennessee Agricultural Crops; cooperative with TVA.
- Hatch 78 Use of Ionizing Radiations in Crop Improvement; cooperative with the UT/AEC Agricultural Research Laboratory.
- Hatch 79 Production and Improvement of Cotton Varieties Suitable to Tennessee Conditions; cooperative with the U. S. Department of Agriculture.
- Hatch 135 Control of Cotton Verticillium Wilt; cooperative with the Agricultural Biology Department and the U. S. Department of Agriculture Cotton Section.
- Hatch 163 Culture of Dark Tobacco.
- Hatch 164 Nitrogen Fertilization of Farm Crops.
- Hatch 183 Crop Response to Liming; cooperative with the Agriculture Department, University of Tennessee at Martin.

- Hatch 184 Effects of Environmental Factors on Ladino Clover and Orchardgrass Persistence.
- Hatch 186 Forage Crops Management: Establishment, Persistence, and Productivity; cooperative with the Agriculture Department, University of Tennessee at Martin.
- Hatch 208 Breeding for Improvement in Small Grain (wheat, oats, barley, and rye); cooperative with the Agricultural Biology Department.
- Hatch 211 Breeding and Genetics of Forage Crops; cooperative with the Agriculture Department, University of Tennessee at Martin.
- Hatch 224 Physiological Responses of Forage Crops to Management and Environment; cooperative with the Animal Husbandry-Veterinary Science Department.
- Hatch 237 The Disposition of Pesticides in the Soil (contributing to Regional Proj. S-62).
- Hatch 238 Controlling Southwestern Corn Borer by Cultural Practices and Resistant Hybrids; cooperative with the Agricultural Biology Department and the U. S. Department of Agriculture.
- Hatch 245 Effects of Pesticides on Turf Pests and Turf-grasses.
- Hatch 250 Influence of Mineralogy of Southern Soils on Certain Chemical and Physical Reactions (contributing to Regional Proj. S-60).
- Hatch 253 Investigation of an Unidentified Corn Virus Disease Occurring in Tennessee; cooperative with the Agricultural Biology Department and the U. S. Department of Agriculture.
- Hatch 255 Fertilization, Soil and Crop Management Systems, Cultural Practices, and Plant Bed Management Systems for Burley Tobacco; cooperative with the U. S. Department of Agriculture.
- Hatch 256 Burley Tobacco Breeding; cooperative with the Agricultural Biology Department and the U. S. Department of Agriculture.

- State 7 Electric Treatment of Plant Materials; cooperative with the Agricultural Engineering and Food Technology Departments, and the U. S. Department of Agriculture.
- State 15 Impact of Mechanization on Costs and Returns in Cotton Production; cooperative with the Agricultural Biology, Agricultural Engineering, and Agricultural Economics Departments.

Bulletins, Articles, and Reports—1967

- Bennett, S. E., Houston Luttrell, Henry Andrews, and John Reynolds
Results of Winter Flaming of Alfalfa in Tennessee, 1965-66. Proceedings of the Annual Symposium on Thermal Agriculture 4:30-31, 1967.
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Nitrogen Solution vs. Water as a Carrier for Prometryne, Trifluralin, C-2059, and SD-11831 Applied Preemergence on Cotton. Proceedings of the 20th Southern Weed Conference 20:57-59, 1967.
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Effects of Sod Height and Time of Herbicide Application on Soil Moisture, Soil Temperature, and Corn Grown on Chemically-Killed Sod. Proceedings of the 20th Southern Weed Conference 20:90-96, 1967.
- Bryant, T. A. and Henry Andrews
Disappearance of Atrazine, Diuron, Norea, Linuron, Trifluralin Diphenamid and Prometryne from the Soil. Proceedings of the 20th Southern Weed Conference 20:395-404, 1967.
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Predicting Soil Losses in Tennessee Under Different Management Systems. Tennessee Agricultural Experiment Station Bulletin 418, 1967.
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Merion Kentucky Bluegrass Response to Soil Residue of Preemergence Herbicides. Weeds 15(2):128-130, 1967.
- Callahan, L. M.
Turfgrass Management—Looking Backwards. Proceedings of the Southern Turf Conference, p. 19, February 1967.
- Fribourg, H. A. and N. C. Edwards, Jr.
Performance of Summer Annual Grasses for Grazing and Green Chopping, 1966-1967. Tennessee Agricultural Experiment Station Bulletin 436, 1967.
- Fribourg H. A., R. H. Brown, G. M. Prine, and T. H. Taylor
Aspects of the Microclimate at Five Locations in the Southeastern United States. Southern Regional Series Bulletin 124, 1967.
- Fribourg, H. A., L. M. Reed, and J. E. Beuerlein
A Library of Digital Computer Programs for the Creation and Main-

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ANIMAL HUSBANDRY-VETERINARY SCIENCE

Proj. No.	Research Project Titles
Hatch 52	Pasture Mixtures and Pasture Management Systems for Beef Production.
Hatch 61	The Improvement of the Producing Ability of Beef Cattle; cooperative with the U. S. Department of Agriculture (contributing to Regional Proj. S-10), UT/AEC Agricultural Research Laboratory, and Ames Plantation.
Hatch 63	Animal Metabolism of Fission Products and Related Nuclides; cooperative with the UT/AEC Agricultural Research Laboratory.

- Hatch 65 The Detection of Animals Heterozygous for Recessive Bovine Dwarfism; cooperative with the U. S. Department of Agriculture and Ames Plantation.
- Hatch 66 The Effects of Radiation on Reproductive Physiology in Farm Animals; cooperative with the UT/AEC Agricultural Research Laboratory.
- Hatch 67 Ripening of Beef from Cattle Produced Under Different Feeding Methods as Related to B-Vitamin Content; cooperative with the Food Science and Institution Management Department.
- Hatch 68 Carcass Value Investigations with Beef; cooperative with the Food Science and Institution Management Department.
- Hatch 70 Evaluation of the Adaptability of Existing Breeds and Commercial Types of Sheep for the Production of Early Milk Fat Lambs (contributing to Regional Proj. S-29).
- Hatch 71 Factors Affecting Feed Utilization by Ruminants; cooperative with the Agriculture Department, University of Tennessee at Martin.
- Hatch 72 Evaluation of Roughages for Beef Cattle; cooperative with the Agriculture Department, University of Tennessee at Martin.
- Hatch 73 Improvement of the Producing Ability of Swine Through Performance Testing and Breeding Methods.
- Hatch 176 Performance of Growing-Finishing Swine on Concrete and Pasture.
- Hatch 218 Performance of Beef Cows as Affected by Initial Winter Condition and Level of Winter Feeding.
- Hatch 222 Pasture Management Systems for Beef Cow Herds.
- Hatch 224 Physiological Responses of Orchardgrass to Management; cooperative with the Agronomy Department.
- Hatch 244 Effect of Cooking Temperature on Yield, Palatability, and Microbiology of Meat; cooperative with the Food Science and Institution Management Department.

Hatch 254	Ante-Mortem Treatment Effects on Pork Carcass Characteristics.
Hatch 257	Effects of Levels of Fatness and Other Carcass Characteristics on Beef Grades and Quality Attributes.
Hatch 266	Ovarian Germ Cell Complement and Reproductive Capacity in Beef Cattle.
State 3	Effects of Fluorine Levels of Soil and Water on Grazing Cattle Under Different Systems of Management.
State 20	Evaluation of Methods of Producing Beef.
State 39	The Effects of Feedlot Design on the Performance of Slaughter Cattle.
State 40	Frequency of Winter Feeding of Beef Cows.
State 41	Improvement of Producing Ability of Beef Cattle.
State 42	Beef Cattle Improvement.

Projects Concluded in 1967

Hatch 12	Type and Breed as Factors Influencing Beef Carcass Characteristics and Consumer Acceptance; cooperative with the Department of Agricultural Economics and Rural Sociology and the U. S. Department of Agriculture.
Hatch 69	Expanded Study and Evaluation of Diagnostic Measures in <i>Vibrio Fetus</i> Infection of Cattle and Sheep (contributing to Regional Proj. S-30).

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CHILD DEVELOPMENT AND FAMILY RELATIONSHIPS

Proj. No.	Research Project Titles
Hatch 265	Influences on Occupational Goals of Young People (contributing to Regional Proj. S-63).

DAIRYING

Proj. No.	Research Project Titles
Hatch 89	The Effects of Processing and Handling Upon the Livability and Fertility of Bull Spermatozoa.
Hatch 92	Development of Strains of Purebred Jerseys Especially Adapted for High Milk Production Under Maximum Grazing and Forage Conditions; cooperative with the Agriculture Department, University of Tennessee at Martin and the U. S. Department of Agriculture (contributing to Regional Proj. S-49).
Hatch 150	Raising Dairy Calves.
Hatch 161	Evaluation of Forages for Dairy Cattle; cooperative with the Agriculture Department, University of Tennessee at Martin.
Hatch 165	Quality and Shelf Life of Dairy Products in the Marketing Channels.
Hatch 199	Absorption of Minerals in Relation to Gastrointestinal Tissue and Ingesta Characteristics in the Dairy Cow; cooperative with the UT/AEC Agricultural Research Laboratory.
Hatch 200	Effect of Processing Methods on Dairy Product Quality.
Hatch 220	Microbiological Aspects of Mastitis.
Hatch 221	Effect of Whole-Body Gamma Irradiation on Milk Cows and Milk Production; cooperative with the UT/AEC Agricultural Research Laboratory.
Hatch 235	Chemical Residues in Milk.
Hatch 242	Reduction or Elimination in Commercial Channels of Adverse Effects of Pesticide Residues on Food and Feed Products (contributing to Regional Proj. SM-32).
Hatch 247	Factors Affecting Voluntary Feed Intake by Ruminants.

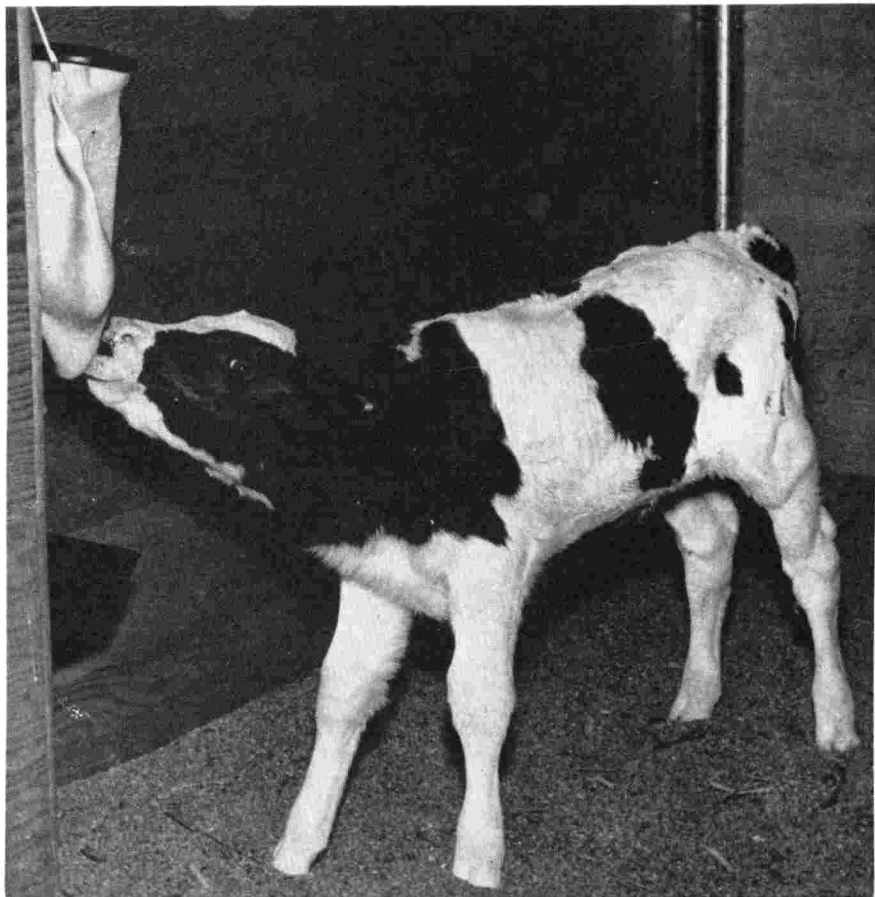


Figure 4. Research has shown that calves may be raised economically by utilizing all colostrum supplies for calf feed. Colostrum may be mixed with milk replacer or milk when the supply of colostrum is short. Picture shows calf consuming colostrum from a nursing bag.

Hatch 248	Factors Related to the Freezing Point of Milk.
Hatch 268	The Identification and Control of Factors Affecting Reproductive Performance in the Bovine Female.
State 22	Effect of Structural Characteristics of Vertical Silos and Silo Equipment and Maintenance Costs, Silage Quality, and Milk Production; cooperative with the Agricultural Engineering Department and the National Silo Association.

- State 36 Effects of Oxytocin Administered in the Dry Period on Subsequent Lactation in Cows.

Projects Concluded in 1967

- Hatch 93 Effect of Variations in Growth Rates and Feeding Practices During Growth of Dairy Heifers on Their Lactation Performance.
- State 24 Feeding Levels During Lactation.

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FOOD SCIENCE AND INSTITUTIONAL MANAGEMENT

Proj. No.	Research Project Titles
Hatch 67	Ripening of Beef from Cattle Produced Under Different Feeding Methods as Related to B-Vitamin Content; cooperative with the Animal Husbandry-Veterinary Science Department.
Hatch 68	Carcass Value Investigations with Beef; cooperative with the Animal Husbandry-Veterinary Science Department.
Hatch 201	Effect of Preparation Procedure on Fatty Acids in Foods.
Hatch 244	Effect of Cooking Temperature on Yield, Palatability, and Microbiology on Meat; cooperative with the Animal Husbandry-Veterinary Science and Food Technology Departments.
Hatch 269	Effect of Elaidinization on Functional Properties of Fat.

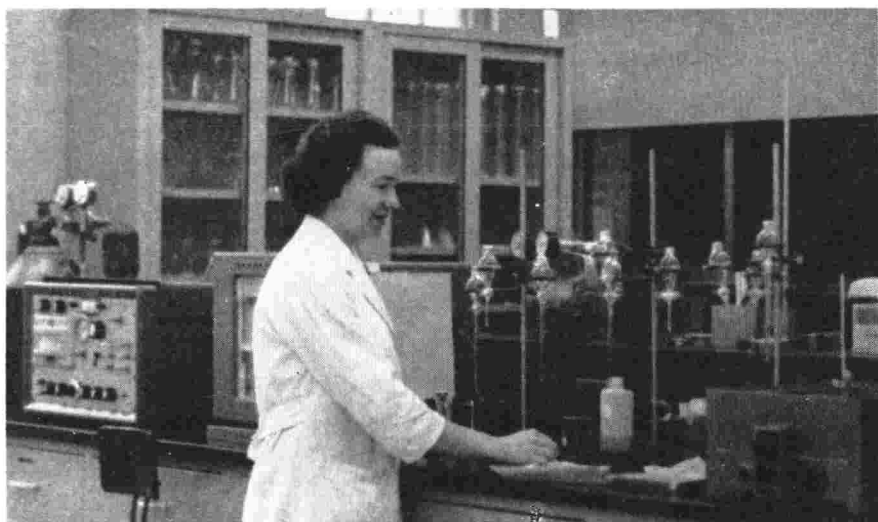


Figure 5. A graduate student in food science is preparing lipid samples for analysis in the gas-liquid chromatograph (left) as a step in the study of lipids.

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FOOD TECHNOLOGY

Proj. No.	Research Project Titles
Hatch 173	Group D. and Other Streptococci in Frozen Foods.
Hatch 177	Flavonoid Pigments and Their Degradation in Processed Fruit and Vegetable Products.
Hatch 193	Improving Firmness of Frozen Vegetables.
Hatch 228	Snap Bean Production Mechanization; cooperative with the Agricultural Biology, Agricultural Economics, Agricultural Engineering, and Horticulture Departments.
Hatch 244	Effect of Cooking Temperature on Yield, Palatability, and Microbiology on Meat; cooperative with the Animal Husbandry-Veterinary Science and Food Science and Institution Management Departments.
State 7	Electric Treatment of Plant Materials; cooperative with the Agricultural Engineering Department.
State 83	Evaluation for Freezing of Fruit and Vegetable Varieties Adapted to Production in Tennessee.

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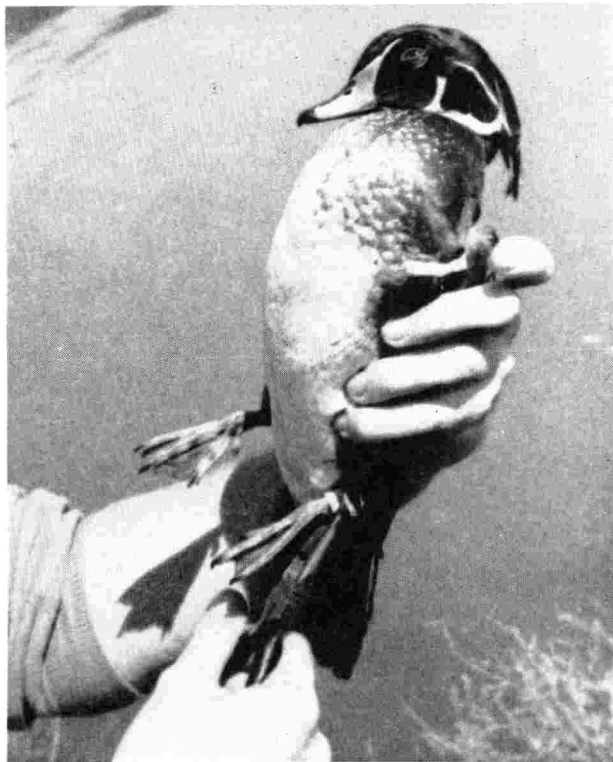
FORESTRY

Proj. No.	Research Project Titles
Hatch 102	Forest Management.
Hatch 103	A Study of Tree Species Adapted to the Different Forest Regions of Tennessee.
Hatch 107	Relationship of Soil and Other Site Factors to Forest Composition and Productivity.
Hatch 185	Forest Tree Genetics (contributing to Regional Proj. S-23).
Hatch 207	Forest Tree Fertilization.
Hatch 271	Forest Tree Breeding.
MS 1	Growth of Mixed Species Plantations.
MS 2	Effects of Fertilization and Irrigation on Tree Growth.
MS 3	Quail Management on Forest and Associated Lands in West Tennessee.



Figure 6. After two growing seasons, differences in survival and height growth among six species of pine (loblolly, shortleaf, Virginia, pitch, Scotch, and white) are evident. The planting site is on the tight clay subsoil of a Fullerton soil. Much of the surface was covered with chert that accumulated after part of the clay matrix had eroded away.

Figure 7. An adult male wood duck is marked with a numbered aluminum leg band. This technique will enable researchers to learn more about the travels of this animal when it leaves the nesting area in East Tennessee.



MS	4	Determinants of Forest-Management Intensity of Private, Nonindustrial Owners in the Tennessee Valley Counties of Tennessee.
MS	5	The Recreation Resources of Large Private Forest Ownerships in Tennessee.
MS	6	Wood Duck Ecology on Rivers and Impoundments in East Tennessee.
MS	7	Blight Resistance in American Chestnut.
MS	8	Christmas Tree Breeding.
MS	9	Characteristics of Juvenile and Branch Wood in Hardwoods.
State	8	Wood Preservation.
State	12	Fertilization of Shade Trees on Lawns; cooperative with the Horticulture Department.

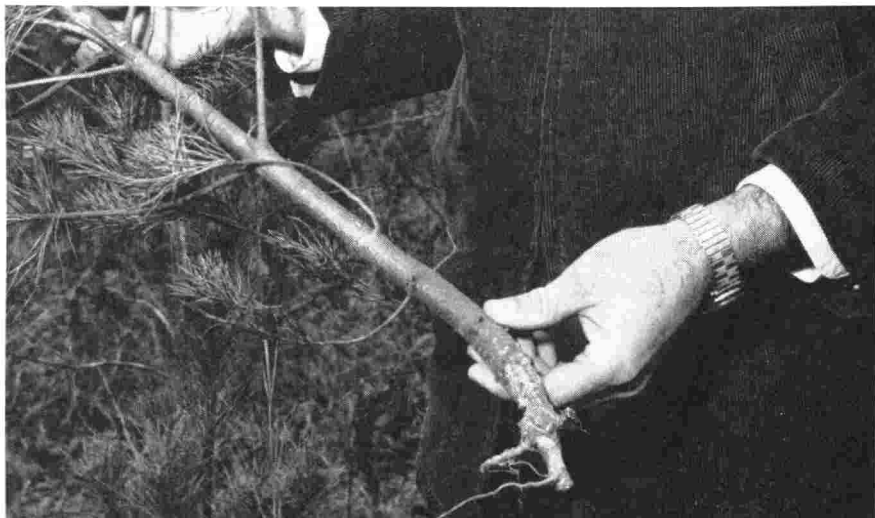


Figure 8. Damage done to Virginia pine seedling by pine voles. These small field mice eat bark, cambium, and roots—often killing the trees, or seriously reducing vigor. (Photo courtesy of the Tullahoma NEWS)

State 30	The University of Tennessee Arboretum.
State 49	Control of Vole Damage to Virginia Pine.

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HOME MANAGEMENT, EQUIPMENT, AND FAMILY ECONOMICS

Proj. No.	Research Project Titles
Hatch 217	Economic Provisions for Old Age Made by Rural Families (contributing to Regional Proj. S-56).

HORTICULTURE

Proj. No.	Research Project Titles
Hatch 32	Chemical Weed Control; cooperative with the Agronomy and Agricultural Engineering Departments.
Hatch 123	Mineral Nutrition of Vegetable Crops.
Hatch 125	Mineral Nutrition of Fruit Crops.
Hatch 126	Vegetable Variety Investigations; cooperative with the Agriculture Department, University of Tennessee at Martin.
Hatch 127	Fruit Variety Investigations.

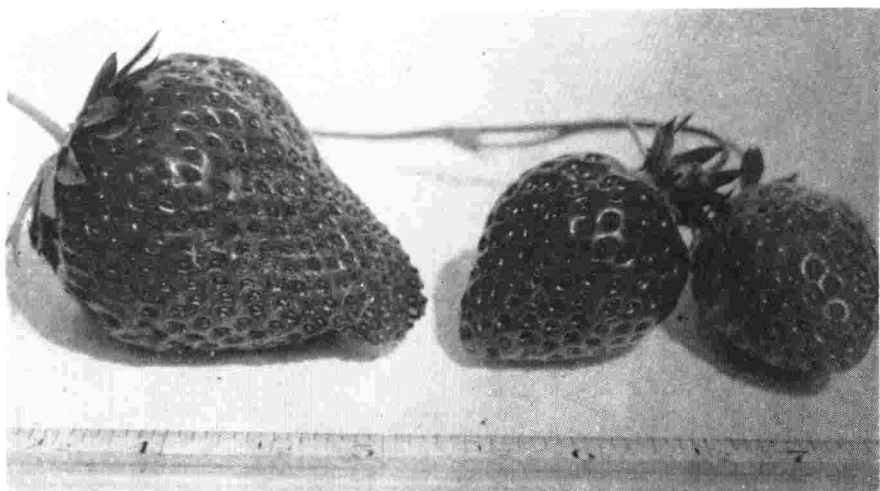


Figure 9. One of the objectives of the strawberry breeding program is to incorporate larger size into strawberry varieties. This photograph shows a large-fruited selection, Tenn. 62-84, compared with a line about the size of our standard varieties. Forty-five to 65 berries per quart are common for Tenn. 62-84. Many of the standard strawberry varieties require 70 to 100 berries per quart.

Hatch 128	Propagation of Fruit and Ornamental Plants.
Hatch 154	Kind and Variety Investigations of Ornamental Plants.
Hatch 157	Management and Evaluation of Plants for Hedges, Screens, and Windbreaks.
Hatch 174	Breeding Strawberries for Tennessee Markets with Emphasis on Climatic Adaptability and Disease Resistance; cooperative with the Agricultural Biology Department.
Hatch 187	Storage and Handling of Evergreen Nursery Stock.
Hatch 228	Snap Bean Production Mechanization; cooperative with the Agricultural Biology, Agricultural Economics, Agricultural Engineering, and Food Technology Departments.
Hatch 230	Radiation Biology.
State 12	Fertilization of Shade Trees on Lawns; cooperative with the Forestry Department.

State	16	Development of Lima Beans Having Specific Seed Coat Covers.
State	27	Studies in Crop Ecology ; cooperative with the U. S. Department of Commerce, Weather Bureau, and the West Tennessee Experiment Station.
State	57	Evaluation of New Plants (contributing to Regional Proj. S-9).

Projects Concluded in 1967

Hatch	167	Breeding Tomatoes for Tennessee Markets with Emphasis on Earliness and Disease Resistance ; cooperative with the Agricultural Biology Department.
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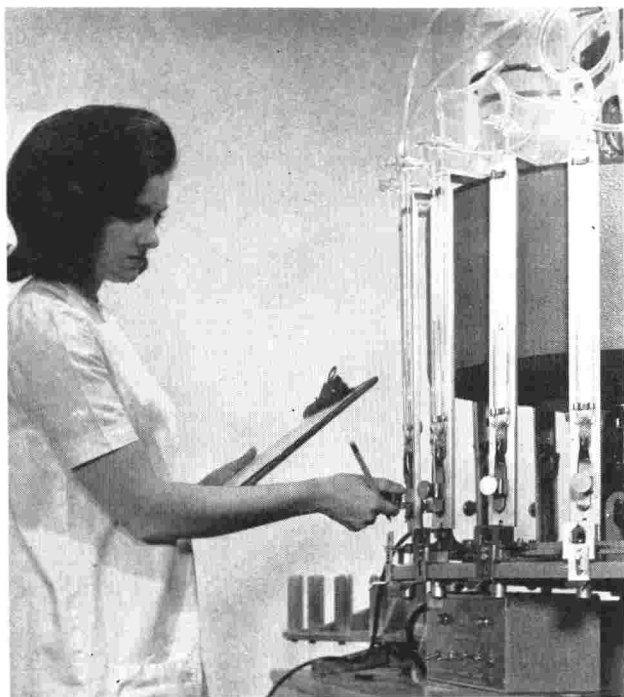
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NUTRITION

Proj. No.	Research Project Titles
Hatch 108	Measurement and Interpretation of Bone Density.
Hatch 234	Effect of Organo-Phosphorus Insecticides on the Fixation of Sulfate by Mucopolysaccharides.

Figure 10. A Warburg apparatus is being used to measure the inhibition of the enzyme acetylcholine esterase by malathion, an organophosphorus insecticide. A comparison of the inhibition of acetylcholine esterase with the depression of sulfate fixation by mucopolysaccharides in malathion-treated rats demonstrated that the depression of sulfate fixation was the more sensitive method of detecting organophosphorus insecticide intoxication.



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| Hatch 267 | Nutritional Interrelationships of Minerals and Other Nutrients (contributing to Regional Proj. S-64). |
| State 18 | Mucopolysaccharides and Cellular Lipoprotein in Vitamin E Deficiency. |

Projects Concluded in 1967

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| Hatch 110 | Metabolism of Calcium, Phosphorus and Magnesium in Preadolescent Children Fed Diets of Plant Origin (contributing to Regional Proj. S-28). |
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PHYSICS

Proj. No.	Research Project Titles
Hatch 131	Genetics and Cytology of Cotton (Evaluation of Cotton Fiber Properties for the Plant Breeder, contributing to Regional Proj. S-1).
Hatch 188	Measurement of Standard Cotton Fiber Properties.
State 31	Elastic Properties of Cotton; cooperating with the U. S. Department of Agriculture.

Figure 11. An instrument for measuring "shear friction" of an assembly of fibers. The test specimen is a multi-web lap. The lap of fibers is oscillated as the swing of the pendulum places the top plate in a horizontal motion. The energy absorbed by the fibers is related to the decreasing amplitude of the pendulum. The "shear friction" may then be calculated from the pendulum amplitudes and the lap dimensions. The instrument is capable of measuring differences among varieties, environmental growing conditions, heat and chemical treatments, humidities, and stages in mill processing.

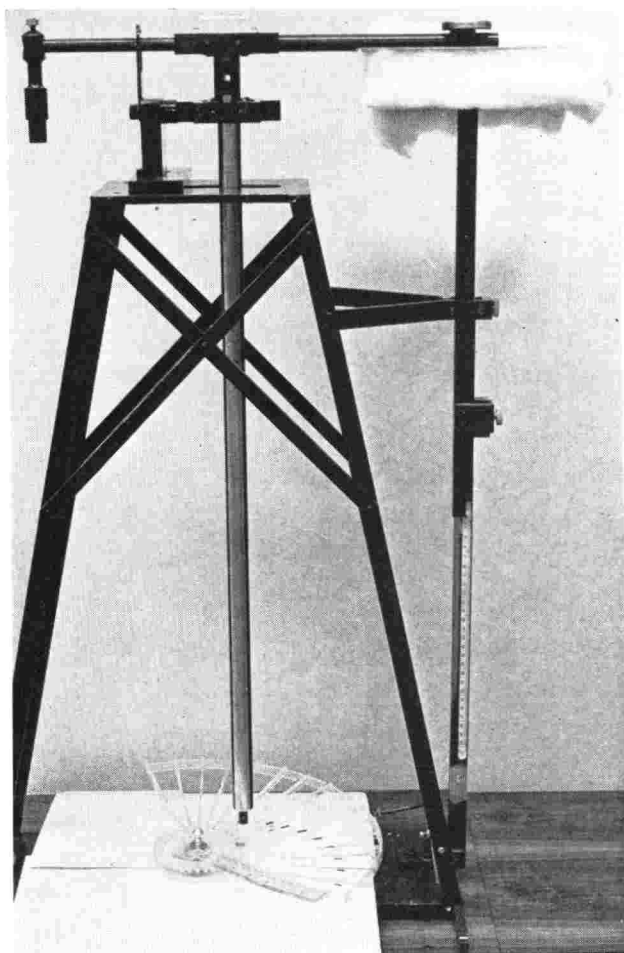




Figure 12. A digital fibrograph for measuring cotton fiber length is shown along with the transistorized control cabinet to the right. Samples are prepared for scanning with the fibrosampler in the left foreground. The digital model fibrograph is readily adaptable to automatic data acquisition.

State 32 Cotton Fiber Strength; cooperating with the U. S. Department of Agriculture.

Projects Concluded in 1967

Hatch 202 Electrical Properties of Cotton Fiber; cooperative with the Agricultural Engineering Department.

Bulletins, Articles, and Reports—1967

Duckett, K. E. and W. E. Deeds

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Henry, Z. A. and S. Worley

A Cotton Opener-Cleaner for Research Samples. Proceedings of the Belt-wide Cotton Production Research Conference. National Cotton Council of America, Memphis, 122-126, 1967.

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Measurement of Shear Friction in Cotton Fiber Assemblies. Proceedings of the Cotton Research Clinic, 24-29, 1967.

Hertel, K. L.

Measurement of Fiber Assembly Shear Energy Transformation. *Textile Research Journal* 37:433-434, 1967.

POULTRY

Proj. No.	Research Project Titles
Hatch 144	Influence of Environment on Performance of Hens.
Hatch 155	Photoperiodism and Physiological Functions of Chickens.
Hatch 160	Improving Diets for Broilers and Roasters.
Hatch 214	Behavioral Responses of Chickens to Environmental Factors.
Hatch 216	Xanthophyll in Poultry Pigmentation.
Hatch 233	The Nutrition of Egg-Production-Type Chickens.
Hatch 258	The Pathogenicity of Selected Salmonellas for Chicken.
Hatch 261	The Effects of Gumboro on Chickens.
State 1	Random Sample Testing of Chickens Available to Tennessee Poultrymen.



Figure 13. The response of commercially-available breeds and strains of chickens to various environmental conditions is determined in "The Tennessee Random Sample Laying Test." Eggs are obtained from hatchery breeding flocks, and set in the Poultry Department incubators. Chicks are sexed at 1 day of age, debeaked, combs removed, vaccinated, and grown to 140 days of age before being placed in laying cages where they are kept until 500 days of age. Records are kept on mortality, cause of death, feed consumption, egg production, egg size, feed conversion, body size, and income over feed and chick cost.

Bulletins, Articles, and Reports—1967

Goff, O. E.

Getting More Egg Profits From Poultry in 1967. Tennessee Market Bulletin, Vol. XI, No. 2, February 1967.



Figure 14. The chemical composition of feedstuffs and the biological activity as measured by response of chicks to such ingredients often fail to agree. One of these mysteries deals with the tannin content of bird resistant grain sorghums and total tannin content of the diet. The inclusion of 0.5% tannin in a chick diet interferes with rapid growth. Including a bird-resistant grain sorghum in such amounts as to supply an equivalent amount of tannin failed to significantly inhibit growth. Spectrophotographic procedures are used by Mr. H. C. Goan to determine tannin equivalent content of grain sorghums and diets. Growth trials and the sorghums preferred by broiler type chicks are additional phases of the study.

TEXTILES AND CLOTHING

Proj. No.	Research Project Titles
Hatch 113	The Relation of Fiber Properties to End Product Performance (contributing to Regional Proj. SM-18).
State 45	Performance of Men's Permanent Press Shirts.

**UNIVERSITY OF TENNESSEE-ATOMIC ENERGY COMMISSION
AGRICULTURAL RESEARCH LABORATORY
OAK RIDGE**

Proj. No.	Research Project Titles
UT/AEC 1	The Interaction of Irradiation and Nutrition.
UT/AEC 2	Postnatal Development and Physiology of Swine.
UT/AEC 3	The Transfer of Materials Across the Maternal-Fetal Membranes.
UT/AEC 4	Radiation and the Reproductive System.
UT/AEC 5	Radiation and Lifetime Reproduction.
UT/AEC 6	Whole Body Gamma Irradiation and the Work Performance and Related Physiology of Shetland Ponies.
UT/AEC 7	Whole Body Gamma and Mixed Neutron-Gamma Irradiation on Large Animals.
UT/AEC 8	Internal and External Irradiation on Dairy Animals.
UT/AEC 9	The Effect of Single and Fractionated Doses in Swine.
UT/AEC 10	Kidney Transplantation in Cattle.
UT/AEC 11	Transmission of Equine Lymphoid and Myeloid Leukemias.
UT/AEC 12	Biological Complexes Influenced by Ionizing Radiation.

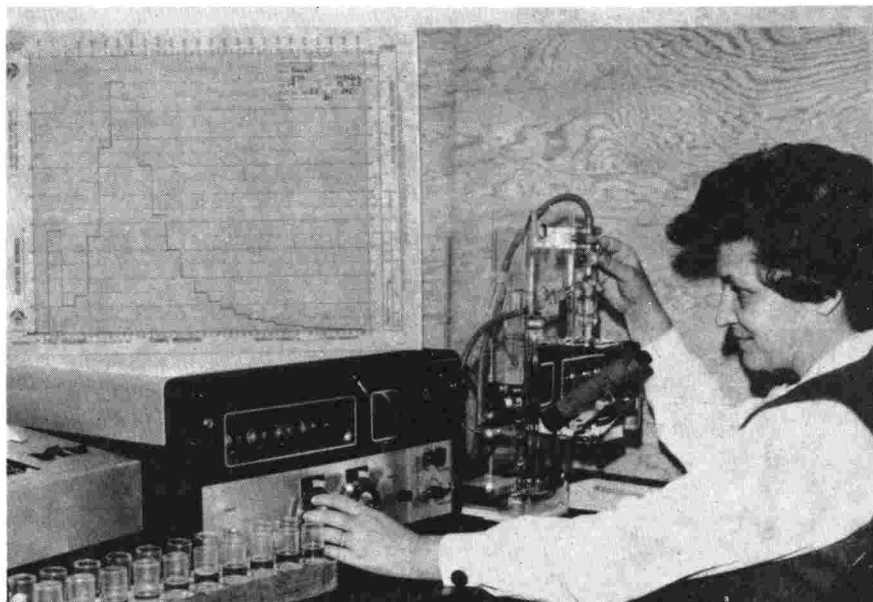


Figure 15. Blood cell size and type are measured by electronic equipment to evaluate the status of animals surviving radiation in long-term experiments.

UT/AEC 13	Biological Half-lives of Radionuclides in Poultry.
UT/AEC 14	Radioiodine Studies in Large Animals.
UT/AEC 15	Trace Mineral Studies in Domestic Animals.
UT/AEC 16	Fixation Reactions in Soils.
UT/AEC 17	The Physical Chemistry of the Diffusion of Ions in Clay Complexes.
UT/AEC 18	Radiosensitivity of Plants and Its Modification.

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Removal of Radioisotopes from Meat and Other Foods. Proceedings of the Ionizing Radiation and Radioisotopes Conference, University of Kentucky, 1967.

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UNIVERSITY OF TENNESSEE AT MARTIN

AGRICULTURE DEPARTMENT

Proj. No.	Research Project Titles
Hatch 33	Evaluation of the Performance of Varieties of Field Crops; cooperative with the Agronomy Department.
Hatch 38	The Comparative Value and Relative Efficiency of Various Phosphate Fertilizers Under Different Soil and Cropping Conditions; cooperative with the Agronomy Department.
Hatch 47	Establishment and Maintenance of Turf; cooperative with the Agronomy Department.
Hatch 71	Factors Affecting Feed Utilization by Ruminants; cooperative with the Animal Husbandry-Veterinary Science Department.
Hatch 72	Evaluation of Roughages for Beef Cattle; cooperative with the Animal Husbandry-Veterinary Science Department.
Hatch 92	Development of Strains of Purebred Jerseys Especially Adapted for High Milk Production Under Maximum Grazing and Forage Conditions; cooperative with the Dairying Department and the U. S. Department of Agriculture (contributing to Regional Proj. S-49).
Hatch 96	Insects Affecting Alfalfa; cooperative with the

- Agricultural Biology Department (contributing to Regional Proj. S-58).
- Hatch 126 Vegetable Variety Investigations; cooperative with the Horticulture Department.
- Hatch 161 Evaluation of Forages for Dairy Cattle; cooperative with the Dairying Department.
- Hatch 183 Crop Response to Liming; cooperative with the Agronomy Department.
- Hatch 186 Forage Crops Management: Establishment, Persistence, and Productivity; cooperative with the Agronomy Department.
- Hatch 211 Breeding and Genetics of Forage Crops; cooperative with the Agronomy Department.
- Hatch 213 Biology, Distribution, and Control of Corn Insects; cooperative with the Agricultural Biology Department.

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STATION PERSONNEL
The University of Tennessee
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1967

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A. F. McFee, Assistant Professor	
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MAIN STATION, KNOXVILLE

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Milan Field Station, Milan, Tom C. McCutchen, Manager

Oak Ridge Forest and Arboretum, Oak Ridge, R. D. MacDonald, Manager

PERSONNEL CHANGES

Appointments

Mary E. Athearn, Assistant in Home Economics-Textiles and Clothing, September 1, 1967

Phyllis N. Atkins, Research Technician, U-T/AEC, June 1, 1967

James C. Barker, Assistant in Agricultural Engineering, June 12, 1967

Clarence E. Bible, Assistant in Journalism, September 1, 1967

John W. Branch, Assistant in Agricultural Engineering, November 13, 1967

William L. Brown, Assistant in Animal Husbandry, January 1, 1967

Will T. Butts, Jr., Assistant Professor of Animal Husbandry, October 1, 1967¹

Billy J. Byerley, Assistant in Agricultural Economics, August 1, 1967

William F. Byrne, Assistant in Dairying, January 1, 1967

John E. Chandler, Senior Laboratory Technician, U-T/AEC, January 1, 1967

Edward T. Cherry, Assistant in Agricultural Biology, January 1, 1967

Richard U. Clark, Assistant in Agronomy, June 19, 1967

James E. Claycomb, Assistant in Dairying, September 15, 1967

David L. Coffey, Assistant Professor of Horticulture, September 1, 1967

John T. Connell, Assistant Professor of Agronomy, Grand Junction, June 1, 1967

Mary N. Connelly, Assistant in Home Economics-Food Science, January 1, 1967

Samuel T. Cooper, Assistant in Agricultural Economics, September 1, 1967

Donald J. Davis, Assistant in Animal Husbandry, July 1, 1967

Gerhard Eisele, Assistant in Animal Husbandry, June 1, 1967

Marvin E. Fielden, Advanced Technician-Maintenance, U-T/AEC, February 1, 1967

Robert D. Freeland, Assistant in Horticulture, September 16, 1967

Raymond N. Gallaher, Assistant in Agronomy, July 17, 1967

Clark D. Garland, Assistant in Agricultural Economics, January 1, 1967

G. M. Gorman, Assistant in Dairy Science, U-T/AEC, January 1, 1967

Effin T. Graham, Associate Professor of Horticulture, August 1, 1967

Robert Granger, Assistant in Agronomy, June 12, 1967

Ray B. Graves, Research Technician, U-T/AEC, April 1, 1967

S. A. Griffin, Associate Professor, U-T/AEC, July 1, 1967

C. L. Gupton, Assistant Professor of Agronomy, Greeneville, July 1, 1967¹

Daniel N. Hamilton, Assistant in Dairying, March 27, 1967

Elvis A. Heinrichs, Assistant Professor of Agricultural Biology, March 1, 1967

David C. Hennessee, Assistant in Agronomy, September 18, 1967

Linda C. Henry, Laboratory Technician, Dairying, January 12, 1967

¹In cooperation with the U. S. Department of Agriculture.

- Roy D. Holder, Assistant in Dairying, August 15, 1967
- Robert Hollowell, Assistant in Food Technology, July 1, 1967
- William M. Hopper, Assistant Professor of Dairying, West Tennessee Experiment Station, August 24, 1967
- Gladys R. Hurst, Senior Laboratory Technician, U-T/AEC, November 1, 1967
- Gordon B. Idol, Assistant in Animal Husbandry, August 16, 1967
- Jay W. Johnson, Assistant in Agronomy, June 14, 1967
- John P. Jordan, Assistant in Agricultural Economics, July 10, 1967
- Waldon R. Kerns, Assistant in Agricultural Economics, June 16, 1967
- D. T. Kirkpatrick, Assistant in Animal Husbandry, U-T/AEC, October 1, 1967
- Frank D. Kirkpatrick, Assistant in Animal Husbandry, September 1, 1967
- F. David Kirkpatrick, Senior Laboratory Technician, U-T/AEC, October 1, 1967
- Lloyd H. Littlefield, Assistant in Poultry, September 1, 1967
- Robert C. Loyd, Assistant in Agronomy, September 18, 1967
- Charles W. Marr, Assistant in Horticulture, September 1, 1967
- Michael D. Martin, Assistant in Forestry, September 1, 1967
- Tom R. McFee, Assistant Superintendent, U-T/AEC, January 1, 1967
- Stanley G. Miller, Assistant in Animal Husbandry, October 1, 1967
- Lynn E. Murray, Assistant in Horticulture, July 1, 1967
- Thomas R. Noonan, Professor, U-T/AEC, January 1, 1967
- Kenneth W. Paxton, Assistant in Agricultural Economics, March 1, 1967
- David W. Porter, Assistant in Animal Husbandry, October 1, 1967
- Lloyd M. Potter, Assistant in Agronomy, Crossville, August 1, 1967
- Marshall F. Priest, Assistant in Agricultural Biology, June 1, 1967
- James F. Ramsey, Assistant in Agronomy, September 18, 1967
- N. W. Robinson, Associate Professor of Animal Husbandry, University of Tennessee at Martin, January 1, 1967
- Nelson E. Rodriguez, Assistant in Agricultural Economics, January 1, 1967
- John R. Roper, Assistant in Agronomy, September 18, 1967
- Thomas M. Roush, Research Technician, U-T/AEC, April 1, 1967
- Joseph H. Rule, Assistant in Agronomy, March 27, 1967
- Leonard W. Russell, Assistant in Food Technology, June 1, 1967
- Charles B. Sappington, Assistant Professor of Agricultural Economics, August 1, 1967
- Sarah A. Smitherman, Instructor of Home Economics-Food Science, February 1, 1967
- James G. Snell, Assistant Professor of Agricultural Economics, July 1, 1967
- Lois E. Southworth, Instructor of Home Economics-Child Development and Family Relationships, September 1, 1967
- John R. Strange, Senior Laboratory Technician, U-T/AEC, August 1, 1967
- Marilyn L. Swatzell, Senior Laboratory Technician, U-T/AEC, September 1, 1967
- Richard L. Tabor, Assistant in Agronomy, March 27, 1967
- Leslie B. Wagle, Research Technician, U-T/AEC, October 1, 1967
- Jacob E. Wiebe, Assistant in Agricultural Economics, January 1, 1967

Frederick R. Wieland, Assistant in Food Technology, September 16, 1967

Lois A. Wodarski, Assistant in Home Economics, March 1, 1967

Terminations

Phyllis N. Atkins, Research Technician, U-T/AEC, September 15, 1967

William R. Backus, Assistant in Animal Husbandry, September 30, 1967

James T. Barron, Assistant in Food Technology, August 31, 1967

Amos L. Bates, Assistant in Forestry, July 3, 1967

Alvin A. Bedel, Assistant in Agricultural Economics, accepted National Defense Educational Act Fellowship, August 31, 1967

Robert K. Berry, Senior Laboratory Technician, U-T/AEC, September 18, 1967

Tommy A. Bryant, Assistant in Agronomy, June 16, 1967

George J. Buntley, Associate Professor of Agronomy, August 31, 1967

Will T. Butts, Jr., Assistant Professor U-T/AEC, September 30, 1967

Joseph F. Connell, Jr., Research Technician, U-T/AEC, September 30, 1967

Lawrence E. Davis, Jr., Assistant in Agronomy, May 31, 1967

Rachel C. Eskew, Laboratory Technician, Dairying, January 16, 1967

Cecil E. Fuller, Associate Professor of Agricultural Economics, January 16, 1967

Charles T. Gamble, Assistant in Animal Husbandry, December 15, 1967

Sylvia D. Gloeckner, Research Technician, U-T/AEC, August 31, 1967

David H. Gordon, Assistant in Dairying, August 16, 1967

George M. Gorman, Assistant in Dairying, January 1, 1967

O. G. Hall, Head, Department of Agriculture, University of Tennessee at Martin, to become Dean of Resident Instruction, College of Agriculture, Knoxville, August 1, 1967

James L. Hammer, Jr., Assistant in Food Technology, December 31, 1967

David C. Hennessee, Assistant in Agronomy, December 15, 1967

Thomas K. Hunter, Assistant in Agricultural Economics, August 31, 1967

Betty I. Jeffrey, Assistant Professor of Home Economics-Child Development and Family Relationships, September 1, 1967

Rosetta M. Johnson, Research Technician, U-T/AEC, December 31, 1967

Robert M. Jones, Assistant in Agricultural Economics, July 10, 1967

Ronald E. Jones, Assistant in Agricultural Economics, August 31, 1967

Waldon R. Kerns, Assistant in Agricultural Economics, July 31, 1967

Joseph J. Knapka, Assistant in Animal Husbandry, September 30, 1967

Curtis F. Lard, Associate Professor of Agricultural Economics, September 19, 1967

John E. Love, Assistant Professor of Horticulture, January 14, 1967

Boyd B. Malone, Research Technician, U-T/AEC, February 8, 1967

Buford A. Maner, Jr., Instructor of Agronomy, transferred to U. S. Department of Agriculture, June 30, 1967

- Robert J. Miravalle, Associate
Professor of Agronomy, June 2,
1967
- Eric L. Morgan, Senior Laboratory
Technician, U-T/AEC, September
15, 1967
- Buelon R. Moss, Assistant in
Dairying, January 1, 1967
- Clayton C. O'Mary, Professor, UT/
AEC, August 15, 1967
- Thomas S. Osborne, Associate
Professor, UT/AEC, April 30,
1967
- Stanton P. Parry, Associate Professor
of Agricultural Economics,
December 16, 1967
- Samuel C. Perry, Senior Laboratory
Technician, U-T/AEC, February
28, 1967
- Lloyd M. Potter, Assistant in
Agronomy, Plateau Experiment
Station, October 9, 1967
- Charles A. Pyron, Assistant in
Horticulture, June 30, 1967
- Calvin O. Qualset, Assistant Professor
of Agronomy, December 5, 1967
- Jack M. Rary, Senior Laboratory
Technician, U-T/AEC, September
14, 1967
- Campbell P. Ridley, Assistant in
Agricultural Engineering,
September 30, 1967
- Hermel Rosas, Senior Laboratory
Technician, U-T/AEC, August 14,
1967
- William L. Sanders, Assistant in
Animal Husbandry, December 31,
1967
- Mary F. Scott, Research Technician,
U-T/AEC, June 23, 1967
- Graham S. Smith, Jr., Assistant in
Agronomy, August 31, 1967
- Margaret J. Smoake, Assistant in
Home Economics-Textiles and
Clothing, August 31, 1967
- Robert G. Thress, Assistant in
Horticulture, June 30, 1967
- Leslie B. Wagle, Research Technician,
U-T/AEC, November 20, 1967
- Mary J. Whitaker, Senior Laboratory
Technician, U-T/AEC, November
14, 1967
- Marilyn S. Williams, Assistant in
Home Economics-Food Science,
January 31, 1967
- Robert N. Wisner, Assistant in
Agricultural Economics, January
31, 1967
- Gene Withrow, Senior Laboratory
Technician, U-T/AEC, December
31, 1967
- Lois A. Wodarski, Assistant in Home
Economics-Food Science, June 30,
1967

Change of Title

- James C. Barker, to Assistant in
Agricultural Engineering, August
14, 1967
- Ada M. Campbell, to Professor of
Home Economics-Food Science,
July 1, 1967
- John W. Cole, to Professor of Animal
Husbandry, July 1, 1967
- Zachary A. Henry, to Associate
Professor of Agricultural
Engineering, July 1, 1967
- Luther H. Keller, to Associate
Professor of Agricultural
Economics, July 1, 1967
- Curtis F. Lard, to Associate Professor
of Agricultural Economics, July 1,
1967
- James K. Miller, to Associate
Professor, U-T/AEC, July 1, 1967
- Aubrey H. Mitchell, to Instructor and
Agricultural Librarian, July 1, 1967
- Harold J. Smith, to Professor and
Head, Agriculture Department,
University of Tennessee at Martin,
July 1, 1967
- Maxwell E. Springer, to Professor of
Agronomy, July 1, 1967
- Homer D. Swingle, to Professor of
Horticulture, July 1, 1967
- 1, 1967

On Leave

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|---|---|
| O. H. Long, Professor of Agronomy,
September 1, 1967 | W. W. Stanley, Professor of
Agricultural Biology, November 25,
1967 |
| Stanton P. Parry, Associate Professor
of Agricultural Economics,
September 16, 1966 to June 1, 1967 | |

Returned from Leave

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| Stanton P. Parry, Associate Professor
of Agricultural Economics, June 5,
1967 | L. N. Skold, Professor of Agronomy,
January 1, 1967
Maxwell E. Springer, Professor of
Agronomy, August 28, 1967 |
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Retirements

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| Leo J. Hardin, Associate Professor of
Agronomy, September 1, 1967 | Willard P. Ranney, Emeritus
Professor of Agricultural
Economics, September 1, 1967 |
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Deceased

- Robert H. Lush, Emeritus Associate
Professor of Dairying, November
24, 1967

¹In cooperation with the U. S. Department of Agriculture.